U.S. Monetary Policy and Emerging Market Credit Cycles

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Abstract

Foreign banks' lending to firms in emerging market economies (EMEs) is large and denominated predominantly in U.S. dollars. This creates a direct connection between U.S. monetary policy and EME credit cycles. We estimate that over a typical U.S. monetary easing cycle, EME borrowers experience a 32-percentage-point greater increase in the volume of loans issued by foreign banks than do borrowers from developed markets, with a similarly large effect upon reversal of the U.S. monetary policy stance. This result is robust across different geographic regions and industries, and holds for U.S. and non-U.S. lenders, including those with little direct exposure to the U.S. economy. Local EME lenders do not offset the foreign bank capital flows; thus, U.S. monetary policy affects credit conditions for EME firms. We show that the spillover is stronger in higher-yielding and more financially open markets, and for firms with a higher reliance on foreign bank credit.

Key words: Global business cycle, monetary policy, emerging markets, reaching for yield

JEL Codes: E34, E52, F34, F44, G21

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I. INTRODUCTION

For emerging market economies (EMEs), foreign bank loans are by far the most important category of cross-border capital flows, and they are denominated primarily in U.S. dollars. As of 2015, International Monetary Fund (IMF) data indicate that loans represent about half of all external liabilities of emerging market countries. By comparison, foreign bond and equity portfolio investments combined represent only about 20 percent. Much of the foreign lending comes from banks headquartered in developed economies: Bank for International Settlements (BIS) data show that roughly a third of all external liabilities of emerging market countries are held by U.S., European, and Japanese banks. Moreover, the volume of these claims has nearly doubled since the onset of the global financial crisis, reaching about $7 trillion in 2016. Consistent with the general dominance of the U.S. dollar in international trade (for example, Goldberg and Tille 2008, Gopinath 2016) and finance (for example, Shin 2012), we document that over 80 percent of the cross-border loans to EMEs are denominated in U.S. dollars.[1] This dollarization of cross-border credit prevails over time and across different geographic regions and industries.

Given the economic significance of U.S. dollar lending by global banks to EME firms, U.S. monetary policy plays an important role as a "push factor" for the credit cycles in these economies through its impact on U.S. interest rates. In particular, by setting the federal funds rate, U.S. monetary policy sets the short end of the dollar yield curve, thereby crucially affecting the supply of credit through banks' dollar funding cost (for example, Bernanke and Gertler 1995). Moreover, U.S. monetary policy influences the yields on longer-term dollar investments due to the expectation hypothesis and direct measures that affect the slope of the yield curve (such as unconventional monetary policy). Figure I illustrates the basic correlation between cross-border loans to EMEs and U.S. monetary policy (as measured by the U.S. federal funds rate) from 1980 through 2015. The significant correlation—tightening/easing of U.S. monetary policy is associated with contraction/expansion in cross-border credit—holds in levels and in changes.

[FIGURE I]

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[1] Throughout the paper, we use the BIS country classification when referring to "EMEs."

The aggregate results in Figure I, while suggestive, could also be explained by relative changes in investment opportunities around the world or by compositional shifts in the investor base in a given country. Instead, the main results in this paper establish the connection between foreign bank lending in EMEs and U.S. monetary policy, using DealScan data on global loan issuance. DealScan covers primarily syndicated loan issuance; that is, loans originated and managed by a small group of banks, but funded by a wider group of creditors. According to Gadanecz and Von Kleist (2002), the estimated outstanding stock of syndicated loans held by foreign banks amounts to about 50 percent of all outstanding cross-border bank claims on Latin America and developing Europe, and to around 100 percent of all outstanding cross-border bank claims on Asia and the Africa-Middle East region. Overall, the data we use in this study cover loan issuance to EME borrowers from 119 countries between 1990:Q1 and 2016:Q3.

Using these detailed loan-level data, we show that U.S. monetary policy easing is associated with a general increase in cross-border loan volumes by global banks from developed countries. Moreover, we document a significant differential effect across markets: in the same quarter, when U.S. monetary policy eases, a given bank provides larger cross-border loan amounts to borrowers from EMEs than to borrowers from developed markets. This differential effect amounts to larger lending volume of about 2 percentage points per 25-basis-point decrease in the U.S. federal funds rate, and it holds after controlling for borrower fixed effects. During a typical monetary easing/tightening cycle in our sample period, the federal funds target rate is adjusted by about 4 percentage points. Given our estimates, this would amount to an additional increase/decline in loan volumes to emerging market borrowers of a sizable 32 percentage points. The results are robust to using country-level macroeconomic variables instead of an EME indicator. Consistent with the risk-taking channel of monetary policy (for example, Adrian and Shin 2010), a reduction in the U.S. federal funds rate pushes global bank flows more strongly into higher-yielding markets (for example, measured by higher GDP growth or higher interest rates). In addition, we validate our results using BIS data that incorporate all claims held by foreign banks against EME borrowers.

Global dollar bank flows to EMEs are also influenced by longer-term U.S. interest rates, which triggers banks' portfolio rebalancing toward riskier assets (for example, Rajan 2005). In particular, we find that—holding constant the level of the yield curve set by the short-term policy rate—a reduction in the term spread (the difference between the 10-year Treasury yield and the

federal funds rate) is associated with a strong flow of dollar capital into EME credit markets. This effect holds throughout the sample period, but is particularly relevant during the zero-lower-bound (ZLB) period when the Federal Reserve kept the federal funds rate at zero and eased monetary policy through unconventional measures that directly impacted long-term rates. Because of the ZLB constraint on the federal funds rate, we also show that unconventional U.S. monetary policy easing during the ZLB period, as measured by the Wu-Xia (2016) shadow rate, strongly pushes dollar capital into the EMEs. Consistent with the special role of U.S. monetary policy, we find that changes in Eurozone interest rates have an effect on euro-denominated credit, but do not have a significant effect on dollar-denominated credit, to EME borrowers.

Monetary policy is intrinsically connected to economic fundamentals (Romer and Romer 2004). To show that the identified relationship between U.S. monetary policy and dollar-denominated credit flows to EMEs is unlikely to be driven by relative or absolute changes in investment opportunities, but is instead due to monetary policy, we proceed in several steps. First, we restrict our sample to dollar loans originated by non-U.S. banks to non-U.S. borrowers and show that the core result holds for lending by global banks with marginal direct exposure to U.S. borrowers. The idea is that these banks are serving the borrowers whose investment opportunities are not directly affected by changes in U.S. economic conditions. Moreover, because we focus on loans to borrowers outside of the United States, the inclusion of quarter fixed effects in the analysis allows us to control for foreign loan demand that is correlated with U.S. economic conditions; however, it does not account for differential loan demand by EMEs. To rule out potentially different correlations between EME credit demand and U.S. economic conditions, we show that the results hold for loans to EME borrowers from (i) both non-tradable and tradable industries, (ii) sectors that produce goods and services with a low country-level export share, (iii) economies with low international trade overall, and, (iv) economies with weak trade ties to the United States. We verify that the effect holds for all geographic regions.

We further show that global bank flows driven by U.S. monetary policy affect EME credit conditions at the firm level. In particular, we confirm that the contraction of credit by banks from developed market economies (DMEs) during a U.S. tightening cycle is not offset by an increase in credit by local banks, but leads to an overall credit contraction and an increase in interest rate spreads for EME borrowers. During a typical U.S. monetary policy cycle where the federal funds rate is increased by 4 percentage points, EME borrowers would experience a 14-percentage-point

stronger contraction in credit volume and a 38-basis-point stronger increase in interest rate spreads than would a similar DME borrower. To highlight the macroeconomic risks of foreign credit outflows from EMEs, we also highlight the relatively short maturity of corporate loans and the large amount of loans coming due in any given year. Related to this, we also find that U.S. monetary policy tightening leads to a lower probability of refinancing maturing loans for emerging market borrowers with a high reliance on foreign banks. Finally, we show that EME infrastructure financing by foreign banks is also sensitive to U.S. monetary policy; these investments are heavily dependent on international capital and, specifically, on syndicated bank credit.

At a high level, our paper contributes to the large economic literature on international spillovers via capital flows, monetary policy transmission, and the role of global financial intermediaries. Most directly, our work expands empirical evidence of a "global financial cycle" that is linked to economic conditions in the center country of the world economy (Rey 2013). In particular, using a VAR approach, Miranda-Agrippino and Rey (2015) show the importance to global asset prices of the cross-border transmission of U.S. monetary policy via financial intermediaries. In addition, McCauley, McGuire, and Sushko (2015) use aggregate data to study the effect of U.S. monetary policy on global dollar credit. Related to the special role of U.S. monetary policy, Takáts and Temesvary (2016), using aggregate BIS data, study the role of currency denomination in the transmission of international monetary policy.

We provide firm-level evidence of the transmission of U.S. monetary policy through the balance sheet of global banks. Other papers that use micro data to study EME credit cycles include recent work by Baskaya et al. (2017), who look at the provision of credit in the Turkish market and connect it to changes in global risk appetite, as measured by the VIX. Demirgüç-Kunt, Horväth, and Huizinga (2017) focus on the role of global banks' charters in foreign markets for the transmission of foreign monetary policy. Morais, Peydró, and Ruiz (2015) and Altunok et al. (2016) examine spillovers of monetary policy through global bank activities in Mexico and Turkey, respectively. In contrast with these papers, our analysis allows us to examine the question in a cross-country setting, covering more than 25 years of global loan issuance. Our emphasis is on the distinct importance of foreign bank lending and, specifically, U.S. dollar lending, in the emerging markets, which is central to the transmission of U.S. monetary policy to EMEs. Bräuning and Ivashina (2017) discuss firm-level evidence on

monetary policy spillovers in major developed economies, but the emphasis there is on the interaction with the currency market, with part of the mechanism being specific to capital flows across major currency areas.

Given our focus on the differential sensitivity of emerging market economies to the transmission of U.S. monetary policy, this paper expands work by Forbes and Warnock (2012), Fratzscher (2012), and Ahmed and Zlate (2014) that has highlighted the importance of U.S. economic conditions, in particular U.S. monetary policy, for capital flows into emerging markets from a bond and equity flow perspective. More broadly, our work contributes to the literature on credit cycles in emerging market economies and the implications for financial stability and economic development. For example, Acharya et al. (2015) and Shin (2016) highlight the risks to financial stability when emerging market borrowers sharply increase dollar leverage during periods of strong capital inflows.

The remainder of the paper is organized as follows: In Section II, we present stylized facts on cross-border lending to EMEs. In Section III, we establish our main result on the effect of U.S. monetary policy on cross-border lending to EMEs. In Section IV, we discuss the consequences of foreign bank funding dependence by EMEs. Section V concludes.

II. U.S. DOLLAR CROSS-BORDER LENDING TO EMES

Foreign bank lending represents a significant fraction of foreign capital inflows to EMEs. As mentioned in the introduction, according to data from the IMF International Investment Position, loans represent about 50 percent of all EMEs' external liabilities.[2] By comparison, Figure II (a) shows that, in 2015, portfolio (vs. direct) bond investment in EMEs represented only about 15 percent of external liabilities, and portfolio equity investment represented about less than 5 percent (these numbers refer to the median values across EMEs). Beyond the composition, bank and broader fund flows display a strong correlation: from 1990 onward, the correlation of loan flows to EMEs with equity and bond flows to EMEs is about 0.50. (This relationship is weaker in the 1980s.) This is consistent with the fact that the core results presented in this paper hold in both the DealScan dataset (which includes primarily data on large corporate loans) and the BIS dataset (which includes data on all claims held by banks.)

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[2] Data on total external liabilities are collected from the IMF statistics and include all claims of foreigners on a given country, including all equity and debt instruments.

Global bank flows are particularly important for EMEs. Combining the IMF data with the BIS Consolidated Banking Statistics, Figure II (b) shows that about a third of all external liabilities of emerging markets are held by large global banks, twice as large a proportion as claims of global banks on developed markets.[3] Moreover, the relative importance of cross-border bank claims for developed-market countries has decreased from 2005 (beginning of the detailed BIS data) to 2015, but the trend has been the opposite for emerging markets. Consistent with Giannetti and Laeven (2012), the BIS data also show that the total volume of foreign bank claims for developed market countries increased from $12 billion in 2005 to $25 trillion in 2008, but then declined steadily to $16 trillion in 2016. In contrast, claims on emerging market countries increased more than threefold throughout the entire sample, from about $2 trillion in 2005 to about $7 trillion in 2016. A similar picture emerges from Figure III, where we plot the share of loans provided by foreign banks using the DealScan syndicated loan issuance data, the core data for our study. Table I presents the sample composition by country. The figure highlights the strong and persistent reliance of EME firms on foreign bank credit. Throughout the period from 1995:Q1 through 2016:Q3, more than 80 percent of all loan commitments to EME firms were provided by foreign banks, while the share was below 50 percent for developed economies.[4]

[FIGURES II & III]

The importance of global bank flows to EMEs points to the potential exposure of these markets to foreign monetary policy. Moreover, because of the dollar dominance of bank capital flows to EMEs, it is U.S. monetary policy that is likely to be most relevant due to its strong effect on nominal U.S. interest rates. The last three columns in Table I show the country-level currency composition of cross-border credit, making it clear that the dominance of dollar-denominated credit is a global phenomenon: from 1990:Q1 through 2016:Q3, the share of dollar-denominated cross-border loans issued to emerging market borrowers is about 87 percent for Africa, 95 percent for the Americas, 81 percent for Asia, and 71 percent for Europe (a smaller dollar share goes hand-in-hand with a higher euro share). Table II, Panel A, shows that, for each

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[3] BIS Consolidated Banking Statistics contains cross-border claims as reported by banks from 21 developed countries. (Claims by banks from the only three emerging market countries in the sample are small.) The reported cross-border claims include all types of bank loans, but also other debt instruments and equity claims.

[4] Indeed, the slight decline in the share of loans to EMEs provided by foreign banks is driven entirely by an increase in domestic lending of Chinese banks.

region, the dollar dominance of cross-border credit holds broadly across borrowers from all industries (based on the 1-digit SIC code) and is not confined to the tradable sectors.[5]

As Table II, Panel B, illustrates, dollar reliance in the broader set of assets held by foreign banks is lower than what we see for corporate loans; yet the majority of claims on emerging markets are still denominated in U.S. dollars. Other currencies, including local currencies, the British pound, or the Japanese yen, play a negligible role. The data come from BIS Locational Banking Statistics and include all claims held by foreign banks including bonds, equities, and non-corporate loans. This adds external validity to our results. For comparison, we construct the outstanding stock of loans using DealScan by aggregating the most recent term loans in the sample that mature after 2016:Q3. Finally, in Figure IV, we highlight that dependence on dollar-denominated credit is a persistent phenomenon that goes back at least two decades.

[TABLE I-II & FIGURE IV]

The evidence presented here substantially expands the evidence presented in earlier work. For example, 69 of the EME countries covered in our sample are not covered in Gopinath (2016). Note that a large part of the samples covered by Goldberg and Tille (2008) and Gopinath (2016) are developed economies. In this study, DMEs are included in the analysis in the next section, but we discuss only the reliance on dollar-denominated credit for emerging markets due to the focus of our study. Discussion of heavy reliance on dollar credit in developed markets can be found in Ivashina, Scharfstein, and Stein (2015) and ECB (2016).

III. U.S. MONETARY POLICY AND CROSS-BORDER LENDING

III.1 Benchmark Results

Building on the economic significance of both cross-border bank lending and dollar-denominated lending, we now focus on establishing across-market spillover of U.S. monetary policy. The dependent variable in Tables III through V is the logarithm of the total amount of cross-border dollar lending, $log(L_{jit})$, by a bank j to a firm i in a quarter t. Banks are consolidated at the bank-parent level, so a loan made by a subsidiary of a U.S. bank based in

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[5] Note that the same currency patterns hold for syndicated loans originated by local banks; however, while syndicated credit is an important part of cross-border lending, it is likely to be a small fraction of domestic lending in EMEs.

Mexico to a Mexican firm is counted as a U.S. "cross-border" loan to Mexico. DealScan loan issuance data are collapsed to the quarterly format. About 2 percent of all borrowers have more than one loan from a given bank in a given quarter; in such a case, we aggregate the amounts. Throughout the analysis, we consider only lenders with relatively large commitments on a given loan.[6] The loan amount for a given bank is computed on a pro-rata basis; for example, in a $150 million loan with three large commitments by banks, L_{jit} for each bank would be $50 million. In our baseline analysis, our key independent variable is the effective federal funds rate, which measures the stance of U.S. monetary policy.

Table III presents our benchmark results. Panel A, column (1), shows the basic relationship between the federal funds rate and global banks' lending abroad: the easing of U.S. monetary policy pushes bank flows into foreign markets, while the tightening of U.S. monetary policy reduces banks' investment in foreign countries. Our hypothesis is that U.S. monetary policy has a differential effect on the bank capital flows to EMEs. Thus, in Table III, the key coefficient of interest is the one on the interaction term between the federal funds rate and a dummy variable indicating whether the borrower is domiciled in an emerging market economy. This coefficient picks up the average differential effect for capital flows to EMEs when the U.S. federal funds rate changes. Specification (2) reports the basic decomposition of the overall effect between developed and emerging markets, showing that, while directionally the results are consistent across the groups, the effect on emerging markets is roughly twice as large as the effect on developed markets. The coefficient estimates indicate that a 25-basis-point decrease in the federal funds rate increases cross-border loan volumes to firms in DMEs by about 2.25 percent, while EME firms experience an increase of about 4.9 percent, a highly significant differential effect of more than 2.6 percentage points (the *t*-statistic is 6.43).

Because we know the borrower's identity and its key lenders, in specification (3) we control for bank and firm fixed effects. This helps us deal with a demand-driven explanation of changes in credit behavior by accounting for time-invariant demand factors, such as firms' size group, location, and industry. Moreover, we include quarterly time fixed effects to net out any common time variation, for example, related to global credit demand factors driven by the global business cycle, overall changes in cross-border loan volumes or changes in the value of the dollar over

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[6] That is, we exclude lenders whose role in the syndicate is identified as merely "participant." Having a syndicate role other than "participant" qualifies a lender for league table purposes.

time. Hence, in this specification, we focus on the differential effect of U.S. monetary policy on cross-border loan volumes to EMEs and find that EME loan volumes react significantly more strongly to U.S. monetary policy changes than do DME loan volumes. In specification (4), we include bank-quarter fixed effects in addition to borrower fixed effects; this allows us to control for time-varying bank heterogeneity, such as individual bank health or changes in business models. The identification in this case is driven by the differential loan volumes to emerging and developed countries of a given bank in the same quarter after netting out any borrower-specific, time-invariant characteristics. The result is very robust. In economic terms, the coefficient in column (4) implies that a 25-basis-point easing in the U.S. federal funds rate increases the volume of cross-border loans to borrowers from emerging markets by an additional 2 percentage points, compared with borrowers from developed markets.

In Appendix Table A.I., we take a closer look at the geographic breakdown of emerging market countries and find that our baseline effect of column (4) holds across all regions. The result is economically and statistically weaker only for Latin America (the point estimate is about two-thirds of the estimated average effect). This is in line with Takáts (2010), who points out that, unlike in other EMEs, the expansion of international banks in Latin America mainly took the form of increased domestic currency lending by local affiliates, making cross-border bank lending relatively less important for these regions. In Appendix Table A.II., we also replicate our baseline result for borrowers from different industries and show that the significantly stronger effect of U.S. monetary policy on EME lending holds for both borrowers from the non-tradable and the tradable sectors, and, hence, is unlikely to be driven by correlated credit demand from EME firms in the tradable sectors.

Our baseline result in column (4) is based on using the federal funds rate as a measure of the stance of U.S. monetary policy. Indeed, the federal funds rate has been the primary tool of U.S. monetary policy for most periods in our sample. Moreover, this policy rate anchors the short end of the yield curve, thereby having a strong impact on the dollar funding cost of global banks, which is a key determinant of banks' dollar lending decisions. In column (5), in addition to the policy rate, we also include the term spread—the difference between the 10-year U.S. Treasury yield and the federal funds rate—as a direct measure of the slope of the yield curve. The coefficient estimates show that the impact of the federal funds rate (the level of the yield curve) stays qualitatively similar, but becomes quantitatively stronger. The coefficient on the term

spread is negative.[7] Hence, holding constant the level of the yield curve (short rate), a smaller slope of the yield curve is associated with a significant increase in EME lending volumes. This finding is intuitive and is consistent with indications of reaching-for-yield motives: when alternative returns on dollar assets are low (low longer-term yields), bank capital is pushed into higher-yielding emerging market economies. Quantitatively, we estimate that a decrease of the term spread of 1 percentage point is associated with an additional increase in EME lending volumes (relative to DME lending volumes) of about 16 percentage points; such a decline in the term spread was observed from December 2008 to June 2013, when the Fed first indicated tapering of its asset purchases.

In column (6), we confirm that the connection between emerging market capital flows and U.S. monetary policy is not a recent phenomenon but holds throughout our sample, including the period before the federal funds rate was pushed to zero in 2008:Q4. Note that the coefficient estimates in this earlier part of the sample are economically smaller when compared with the estimates for the full sample. In column (7), we look at the period when the federal funds rate was at the zero lower bound (that is, the period from 2008:Q4 though 2015:Q3). During this period, the federal funds rate was not the only tool of monetary policy, as the Fed conducted additional monetary easing through unconventional policies, including forward guidance and large-scale asset purchases. In fact, during this period, the Fed committed to keeping policy rates at zero for an extended period of time. Therefore, during this period, we use the Wu and Xia (2016) federal funds shadow rate, which provides a single measure that takes into account unconventional monetary policy measures during the post-2008 zero-lower-bound period. We find that this additional easing in U.S. monetary policy during the zero-lower-bound period increased EME lending volumes significantly more than cross-border loan volumes to developed markets. Indeed, the coefficient estimate is roughly similar to the estimate of the federal funds rate reported in column (4). (Results in column (4) are similar if we replace the federal funds rate with the shadow rate during the ZLB period.)

[TABLE III]

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[7] Historically, the term spread increased when the Fed eased monetary policy by lowering short-term rates (correlation of –0.83 during the pre-ZLB period), while during the ZLB period unconventional easing compressed the term spread. Here, we estimate the effect of a lower term spread *conditional* on a given level of the short rate, that is, we effectively estimate the effect of low long-term rates.

The results in Table III, Panel A, show a strong connection between U.S. monetary policy and cross-border dollar lending to EME firms. The Fed's monetary policy actions, however, are endogenous to changes in economic conditions in the United States (Romer and Romer 2004). For example, the Fed would typically ease monetary policy when U.S. economic conditions worsen, a period when loan demand in the U.S. could be declining. This could lead to a concern that our earlier results are driven by changes in global banks' relative investment opportunities (the demand channel) and not by the effect that monetary policy has on cross-border dollar credit. We start to address this concern by restricting our sample to loans originated by non-U.S. banks to non-U.S. borrowers. Importantly, we consider only loans by non-U.S. banks with a low exposure to the U.S. economy. The idea is that banks with low exposure to the U.S. economy are serving the borrowers whose investment opportunities are not directly affected by changes in U.S. economic conditions.

We measure a bank's exposure to the U.S. economy by the share of cross-border loans to U.S. borrowers relative to all cross-border loans over our sample period. Results are robust to measuring banks' U.S. exposure based on a rolling window instead. About 25 percent of banks in our sample have no lending to U.S. borrowers; but these banks account for only 1 percent of all loans. Instead, we define low-U.S.-exposure banks as banks with less than 5 percent (and, as a robustness check, 10 percent) of loans to U.S. borrowers. These low-U.S.-exposure banks account for roughly 10 percent of all loans (25 percent for the 10-percent-exposure cutoff). The results, reported in Table III, Panel B, are comparable to those shown in Panel A, column (5). The first two columns of Panel B show that, for non-U.S. banks with low direct exposure to the U.S. economy, the significantly stronger increase of EME loan volumes continues to hold. In column (2)—loans by non-U.S. banks with less than 5 percent of their loans to U.S. borrowers,—we find a significant, albeit quantitatively and statistically weaker (t-statistic of 1.79), differential effect for EMEs.

A decline in economic activity in the United States (correlated with an easing monetary policy) is likely to negatively affect U.S. suppliers and EME exporters more broadly. This suggests a positive correlation between U.S. economic conditions and EME loan demand, which should bias our estimates downward. In columns (3) to (6), we therefore look at loans originated by non-U.S. banks with a low U.S. exposure to EME firms that are unlikely to be affected by changes in investment opportunities in the U.S. economy. Specifically, in column (3), we look at

loans to EME firms from the non-tradable sectors based on the 1-digit SIC classification as reported in DealScan. In column (4), we identify, for each EME country separately, borrowers that produce goods and services that have a low export share relative to all exports of each country (goods and services with an export share smaller than the 25th percentile of the within-country distribution). In column (5), we look at loans to EME firms from countries with low trade (trade relative to the country's GDP smaller than the 25th percentile of the cross-country distribution), and in column (6), we look at loans to EME firms from countries with low trade with the United States (U.S. trade relative to the country's total trade smaller than the 25th percentile of the cross-country distribution). Country-level data on trade statistics are presented in Table I. The results show that once we focus on loans by non-U.S. banks with low U.S. exposure to borrowers that are unlikely to have a strong link to U.S. economic conditions (and hence their time-varying loan demand is orthogonal to U.S. economic conditions), we see that the differential effect of U.S. monetary policy on EME loan volumes indeed becomes larger and statistically more significant. For example, when we focus on loans to EME firms from countries that have weak trade linkages with the United States, the coefficients on the federal funds rate are over twice the size of the estimates based on the full sample of loans (column 6 in Panel A). Economically, these borrowers experience a sizable 8.7-percentage-point stronger loan volume increase when the federal funds rate decreases by 25 basis points compared with a similar DME firm.

So far, we used a coarse measure to identify EME borrowers, based on the BIS classification. In Table IV, we look instead at the underlying country characteristics (compiled from World Bank information) and examine how these characteristics interact with U.S. monetary policy. In column (1), we find that borrowers from countries with higher GDP growth receive larger loan volumes. This result controls for borrower fixed effects; the coefficient is therefore identified from variation in the interest rate spread of a given country. The level effect indicates that a 1-percentage-point increase in the borrower country's GDP growth is associated with a 1.4 percent increase in cross-border loan volumes. Moreover, as the negative coefficient on the interaction term indicates, borrowers in these countries are also more sensitive to capital in/out-flows when U.S. monetary policy eases/tightens. Similarly, high-GDP-growth countries are more sensitive to global bank flows when the U.S. term spread changes (column 2). The estimate on the interaction term indicates that sensitivity to the U.S. federal funds rate increases by about 0.6

percentage points when the borrower country's GDP growth increases by 1 percentage point. In columns (3) and (4), we show that the stronger sensitivity of bank flows to U.S. monetary policy holds when we use another measure for a high-yield market—the difference between the borrower country's interest rate and the U.S. federal funds rate. The estimate on the interaction term indicates that the sensitivity to U.S. monetary policy changes increases by about 0.3 percentage points when the interest spread increases by 1 percentage point. Qualitatively similar results hold when we consider higher growth in their national stock market index as a proxy for high-yield markets. (The underlying sample changes, due to data availability.) In column (7), we find that borrowers from high-risk countries (as measured by the lagged rating for long-term sovereign debt collected from Fitch Ratings) receive smaller loan amounts. However, the negative coefficient on the interaction term shows that loan volumes to high-risk countries increase more strongly than loan volumes to low-risk countries if U.S. interest rates decrease, in terms of both a lower federal funds rate and a lower term spread (column 8). Overall, the evidence is in line with reaching-for-yield behavior, where DME banks increase syndicated loan originations in riskier and high-growth markets when U.S. interest rates are low (for example, Bruno and Shin 2015).

<center>[TABLE IV]</center>

III.2 Specialness of U.S. Monetary Policy

U.S. monetary policy affects banks' overnight dollar funding cost and can influence the yield on alternative longer-term dollar investments. Given that cross-border lending to EMEs is denominated primarily in dollars, we postulate that U.S. monetary policy plays a special role in driving global dollar credit flows to EMEs. In Table V, we provide further evidence on the specialness of U.S. monetary policy by looking at monetary policy in the euro area.

Historically, there has been strong co-movement between monetary policy decisions taken by the Fed and those taken by the European Central Bank (ECB). Between 1999 (the introduction of the euro) and 2016, the correlation between the euro overnight interest rate (EONIA) and the federal funds rate is 0.81 and the correlation of the 10-year term spreads is 0.60. It is therefore not surprising that if we just replace the U.S. variables with their equivalents for the euro area, the results will be economically and statistically similar, see column (1) of Table V. Instead, in

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specification (2), we expand our baseline specification (Table III.A, column (5)) to include both the U.S. and the European interest rates and term spreads. We find that the estimates of the euro-related variables are close to zero and are statistically insignificant, while the coefficients on the dollar variables remain economically large and statistically significant. In specification (3), we exclude U.S. lenders from the sample and show that non-U.S. banks also adjust their dollar lending to EMEs in response to changes in U.S. monetary policy. The estimates are economically very similar to those for the full sample. In column (4), we show that the results also hold for quarters with the opposite movement in monetary policy stance; for example, quarters when the United States was in a tightening cycle and the euro area was in an easing cycle.[8] From 1999:Q1 through 2016:Q3, there are 20 such quarters when the stance of U.S. and euro-area monetary policy differed. Finally, in column (5), we look at the euro-denominated cross-border lending of U.S. banks to non-euro borrowers and confirm that for this currency the euro interest rate does matter.

[TABLE V]

III.3 Macro-Level Evidence

By looking at the syndicated loan data, we can (i) focus on corporate loans, (ii) analyze new loan issuance (vs. stock), (iii) focus on specific currencies, (iv) look at the sample dating back to 1990, and (v), most importantly, identify individual borrowers and lenders to address alternative explanations for our findings. While this cannot be done with aggregate BIS data, it is informative to examine whether a similar relationship between U.S. monetary policy and bank capital flows from developed to emerging markets holds in this sample, especially given that the BIS data are not constrained to syndicated credit, but instead include all forms of claims held by the banks. In Table VI, we look at the logarithm of the cross-border claims, $log(C_{JIt})$, by a banking sector in country J on nonbank private firms in country I (for example, all claims held by British banks on nonbank firms in Kenya) in quarter t. The data are from the BIS Consolidated Banking Statistics and cover the period from 2005:Q1 to 2016:Q3.

Table VI, column (1), shows that overall cross-border claims on nonbank firms increase when there is monetary policy easing in the United States. Similar to the results in Table III, when we look more closely to see in which countries banks invest when U.S. monetary policy

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[8] We define a tightening/easing cycle based on quarters when the policy rate increased/decreased and all subsequent quarters where the rate was not decreasing/increasing until a reversal of policy occurred.

easing occurs, we see that the effect is largely driven by investments in emerging markets (column 2). In column (3), we add time fixed effects, banking-sector country fixed effects, and borrower-country fixed effects, thereby mimicking our set of fixed effects from Table III. The significance of the differential effect in the sensitivity to U.S. monetary policy between claims to emerging and developed market countries is robust to the inclusion of these controls. In economic terms, specification (3) shows that emerging market claims increase by an additional 2.5 percentage points compared with developed market claims when the U.S. eases monetary policy by 25 basis points. In column (4), we add banking-sector-quarter fixed effects to the specification, which allows us to control for any time-varying heterogeneity at the banking-sector level. For example, this would accommodate a general contraction in credit abroad of all Japanese banks due to problems in the Japanese banking sector like the shock examined by Peek and Rosengren (1997, 2000). Inclusion of these tighter controls slightly decreases the size of the estimates, but the relationship between monetary policy and bank activity in the emerging markets remains strong. Inclusion of the term spread renders similar results to those of the loan-level analysis (column 5).

[TABLE VI]

In columns (6) and (7), we look at cross-border interbank claims from banks in developed markets on banks in EMEs. In some countries (for example, Turkey) global banks' capital flows are intermediated by the domestic banking sector. In such settings, the negative impact of capital outflows might be amplified due to increased leverage of the domestic banking sector. From the results in Table VI, we see that interbank claims on banks in emerging markets (relative to cross-border claims on banks from developed markets) increase strongly when U.S. monetary policy eases. Indeed, the point estimates suggest that the effects are more than twice as large as the estimates for claims on nonbank firms. We also verify that this result holds across different EME regions (unreported). However, BIS data indicate that cross-border interbank claims are smaller, with claims on EME banks being about a third of the value of claims on EME (non-bank) firms on average.

Rajan (2014) points out that "[c]ountries that undertake textbook policies of financial sector liberalization are not immune to the inflows—indeed, their deeper markets may draw more flows in, and these liquid markets may be where selling takes place when conditions in advanced economies turn." We examine this proposition in Table VII using the financial openness index

of Chinn and Ito (2006), which measures the degree of a country's capital account openness based on various restrictions on cross-border financial transactions. The index ranges from 0 (no financial openness) to 1 (full financial openness) and is available at a quarterly frequency through the end of 2014. Unfortunately, there is limited time variation of this measure for a given country. Given that the analysis is effectively cross-country, we report results using the BIS dataset, which has broader coverage of EME countries at the quarterly frequency than DealScan.

Column (1) of Table VII shows that—as one would expect—foreign banks hold more claims on private nonbank entities from EME countries that are more financially open. Note that the regression includes banking-sector country and host-country fixed effects; therefore, the coefficient is identified from changes in financial openness of a given country over time. In column (2), we test whether bank capital flows to financially open countries are more sensitive to U.S. monetary policy. Indeed, the negative estimate indicates that financially open countries have a larger increase in bank claims when U.S. monetary policy eases and a stronger retrenchment when monetary policy tightens. The coefficient estimate in column (3) is robust to a tight set of fixed effects and indicates that if the financial openness index of a given country increases by one standard deviation (0.34), the sensitivity of cross-border claims to U.S. monetary policy increases by an additional 2.4 percentage points (-0.07*0.34). We do not find a significant interaction with the term spread in column 4. The result is quantitatively robust to controlling for country risk in column (5), and, therefore, is not driven by the possibility that changes in a country's financial openness may be correlated with a different (time-varying) risk profile. (The change in sample from column 4 to 5 is due to limited data availability of country ratings.)

[TABLE VII]

IV. CONSEQUENCES OF FOREIGN CREDIT DEPENDENCE

Results presented so far indicate a substantial dependence of foreign-dollar credit to EME borrowers on the stance of U.S monetary policy. We next analyze the extent to which the large capital inflows during periods of U.S. monetary easing and the subsequent retrenchment of foreign capital during a U.S. monetary policy contraction affect the credit conditions of EME borrowers at the firm level. After all, at the individual-firm level, inflows and outflows of foreign capital may just lead to a substitution between foreign and domestic lenders, leaving overall

firm-level funding conditions unchanged. Thus, studying substitution effects at the individual-firm level is crucial to assess the dependence of local credit cycles in emerging markets on the stance of U.S. monetary policy. While Table VIII presents the detailed analysis, Figure V shows that such substitution is unlikely, given a slightly positive correlation between cross-border and local lending in EMEs.

In Table VIII, the dependent variable is the logarithm of the total amount of dollar lending to a firm in a given quarter (that is, $log(L_{it})$) by (a) all foreign banks (columns 1 and 2), (b) all domestic banks (column 3), and (c) all banks (columns 4 through 6).

In columns (1) through (4), we focus on firms with both foreign and local creditors in a given quarter. In columns (1) and (2), the estimates show that the change in the cross-border credit volume in response to U.S. monetary policy is stronger for firms from emerging markets than for firms from developed market economies. The coefficient estimate in column (2) indicates that in response to a decline in the U.S. federal funds rate of 25 basis points, cross-border lending volumes to EME firms increase by 1.9 percentage points more than the respective cross-border volumes to comparable DME firms. (This amounts to an average reduction of $7.25 million.) On the other hand, if U.S. monetary policy tightens, local banks do not offset the contraction in foreign bank credit by increasing their lending volumes to local EME firms (column 3). Indeed, the estimate indicates that not only foreign, but also local, dollar credit contracts. We estimate that local lenders reduce their lending by 2 percentage points, or $4.8 million, per 25-basis-point increase in the federal funds rate. Overall, due to the strong reduction of foreign bank credit and the lack of substitution between local and foreign lenders, U.S. monetary policy tightening of 25 basis points leads to a 2-percentage-point stronger overall decline in dollar credit for emerging market firms (column 4) than for developed market firms. While the lack of substitution might not be surprising in the banking context, this result is in sharp contrast to findings that for securities markets, local investors (at least partly) offset a decline in foreign holdings (see Forbes and Warnock 2012). The lack of substitution, in turn, magnifies the overall effect that foreign capital withdrawal might have on the economy (Caballero and Simsek 2017).

In columns (5) through (8), we broaden our sample and consider any firm that obtained cross-border funding in a given quarter, that is, firms that are exposed to global bank capital flows. In columns (5) and (6), we also see that in the broader sample EME firms experience significantly stronger loan volume changes in response to U.S. monetary policy than do DME

firms. In column (6), the estimated coefficient indicates a reduction of about 1 percentage point per 25-basis-point increase in the federal funds rate. Column (6) also shows the coefficient on the U.S. term spread, which is directionally consistent with our earlier findings, but not significant at a conventional level. In columns (7) and (8), we estimate the effect of U.S. monetary policy changes on the interest rate spread paid by firms on their dollar borrowing, which we compute as the average all-in-drawn spread to the 3M LIBOR rate based on all loans taken out by the borrower in a given quarter. (The sample changes from column (6) to (7) because the interest rate data are not available for all loans.) The positive point estimate indicates not only that EME firms face higher sensitivity of volumes than DME firms, but also that the price of credit is more sensitive to changes in U.S. interest rates for EME firms than for DME firms. This holds for both the federal funds rate and the term spread. For example, in column (8), we estimate that a 25-basis-point increase in the federal funds rate increases the interest rate spread by 2.4 basis points more for EME firms than for comparable DME firms. We estimate a quantitatively similar effect for an increase in the term spread.

[FIGURE V & TABLE VIII]

Intuitively, EME firms that are more dependent on foreign bank credit may be more affected than other EME firms by fluctuations in cross-border capital flows triggered by U.S. monetary policy changes. To test this intuition, we restrict our sample to EME firms and compute for each firm its dependence on foreign bank credit. More precisely, for each firm-quarter, we compute the number of foreign banks that lent to the firm (relative to the total number of banks that lent to that firm) in the last quarter when the firm was obtaining a loan. The explanatory variable of interest is the interaction term between this foreign bank-reliance measure and the U.S. federal funds rate. The results are reported in Table IX.

In columns (1) through (4), we focus on the logarithm of the total volume of dollar borrowing by an EME firm in a given quarter. Column (1) shows that—consistent with our previous results—the U.S. interest rate is negatively associated with the borrowing amounts. Moreover, the positive coefficient on the foreign bank-reliance variable indicates that banks with more reliance on foreign banks borrow larger amounts. Our focus is on the interaction term between the U.S. interest rate and the foreign bank-reliance variable. In column (3), once we control for borrower and quarter fixed effects, thus focusing on the cross-section of borrowers, we find a negative coefficient estimate, indicating that firms with a higher reliance on foreign-

bank credit experience a larger decline in lending volumes when U.S. monetary policy tightens than similar firms with a lower reliance on foreign banks. For example, if U.S. interest rates increase by 25 basis points, we estimate that a firm with a one-standard-deviation larger foreign bank reliance share (0.32) experiences an additional reduction in total borrowing of about 28 basis points. This effect becomes somewhat larger once we also include the interaction with the term spread, but the estimate loses significance (*t*-statistic of -1.19).

In columns (5) and (6), we analyze the interest rate spreads of EME firms, depending on their past foreign bank reliance. In column (6), the point estimates indicate that in general EME firms with higher foreign bank reliance pay smaller interest rate spreads (a one-standard-deviation larger foreign bank share reliance is associated with a 25-basis-point lower spread). However, they also experience a larger sensitivity of spreads with respect to both changes in the federal funds rate and the U.S. term spread. For example, if the federal funds rate increases by 25 basis points, we estimate that a firm with a one-standard-deviation larger foreign bank reliance would face a 1.2-basis-point larger increase in spreads (14.43*0.32*0.25), while a similar increase in the term spread would lead to a 1.9-basis-point larger increase in spreads (25.392*0.32*0.25).

Concerns may arise that the results on credit volumes and spreads take into account only granted loans (intensive margin of credit) and do not capture the extensive margin of credit (new loan issuance). To understand the importance of this point, we should emphasize the relatively short maturity of corporate loans: the median maturity of a corporate loan in our sample is five years (mean of 4.3 years). As of the end of 2016, roughly half of the loans outstanding matured within two years, which points to a substantial macroeconomic risk. To address this issue, in Table IX, columns (7) and (8) we estimate the probability of refinancing maturing loans to EME firms. More precisely, for each firm, we look at those quarters where an existing dollar loan matures. We then construct a dummy variable that equals one when we also observe a new loan to the firm, and zero otherwise. As before, we focus on the variation related to the U.S. monetary policy pass-through by foreign banks, holding constant firm and time characteristics.

In column (7), Table IX, we find that if U.S. monetary policy tightens, EME firms with higher foreign bank reliance face a significantly lower probability of refinancing their maturing loans. A 25-basis-point increase in U.S. interest rates lowers the probability of refinancing by about 2 basis points for each standard deviation (0.32) increase in foreign bank reliance (-0.023*0.25*0.32). This corresponds to a 1 percent reduction when compared with the average

probability of refinancing of 16.3 percent in our sample. In column (8), the effects become more than twice as large, once we also include the interaction term between past foreign bank reliance and the U.S. term spread. Moreover, we also find that changes in the term spread transmit differentially to EME firms' probability of refinancing, depending on their past foreign bank reliance.

[TABLE IX]

As a final reflection in this paper, we look at the financing of large infrastructure projects, that is, projects related to the provision of essential services that are relevant for the broader economic development and growth of an economy. The idea is to look at lending to a segment that has an unambiguous impact on the real economy. It is also a segment that is likely to be very sensitive to the availability of foreign bank financing (for example, Ehlers 2014, World Bank 2016). Indeed, the alternative to privately syndicated credit is loans from multinational institutions, which tend to follow a very different and intense compliance process.[9] It is also broadly acknowledged that global infrastructure needs largely exceed infrastructure investments, a gap that is anticipated to increase in the future.[10] So, whereas some skepticism might remain as to how hard it is to find alternative financing for corporate investing or whether this type of credit is beneficial in first place, infrastructure investment is high-impact investment for which it is very difficult to find a substitute for global banks' funding. Infrastructure lending is an important part of our sample: DME banks have increased investment in infrastructure projects in EMEs during the last 25 years, rising to a total volume of $25.8 billion in 2014, which equals 13.5 percent of all new loan volumes committed to EME borrowers. In the Appendix, we show that an easing of U.S. monetary policy increases loan origination of infrastructure projects in EMEs to a significantly greater degree than in developed markets.

V. CONCLUSIONS

The mandates of central banks are typically focused on domestic economic conditions and do not account for potential international spillovers. There are some isolated examples of

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[9] As an example, failure to close a private syndication due to the unravelling of the 2008 financial crisis led to a roughly two-year delay in raising debt funding from multinationals for a construction project of the Egyptian Refinery Corporation.

[10] For example, http://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/bridging-global-infrastructure-gaps

collaboration among monetary authorities of major currency areas, but EMEs remain outside of these coordination efforts. Following the 2008 financial crisis, this issue has resurfaced in the public debate in the context of large capital inflows into EMEs associated with unprecedented monetary policy accommodation in major currency areas, through both conventional and unconventional measures. Rajan (2014) postulates that emerging market countries wish for stable global capital inflows instead of flows pushed in by foreign monetary policy and points to the unlikelihood that local policy measures will be effective to counteract the global forces. But substantial skepticism about whether a global macro-prudential approach to monetary policy is necessary still remains among economists and monetary authorities (for example, Bernanke 2013).

In this paper, we provide evidence on the dominance of dollar-denominated credit in cross-border lending. Outstanding shares of foreign banks' dollar credit for African, American, and Asian emerging economies are over 90 percent. Even for emerging Europe, this number is 60 percent. This point highlights the special role that U.S. monetary policy plays in the formation of credit cycles in EMEs (and the limited role of the local monetary policy). We also show that the availability of foreign bank credit to EME firms—by far the largest category of foreign capital channeled through financial intermediaries into EMEs—is strongly connected to U.S. monetary policy. This effect disproportionately affects EME borrowers as compared with borrowers in developed markets. We estimate that, during a typical monetary easing cycle over which the Fed cuts its target rate by about 4 percentage points, the increase in loan volumes to emerging market borrowers exceeded the flow into developed markets by 32 percent. On the flip side, a monetary policy tightening would pull out bank flows from emerging markets and lead to a strong contraction of foreign credit in emerging markets. The granularity of the data allows us to control for borrower time-invariant characteristics as well as for bank-quarter level effects in lending. We show that the effect holds for non-U.S. banks, for banks with very small exposure to the United States in their portfolio, for EME borrowers in the non-tradable industries, for borrowers in countries with limited trade linkages to the United States, and overall—and only for U.S.-denominated credit.

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FIGURE I

CROSS-BORDER LOANS TO EMERGING MARKETS AND U.S. MONETARY POLICY: 1980–2015

(a) Relationship in Levels

(b) Relationship in Changes
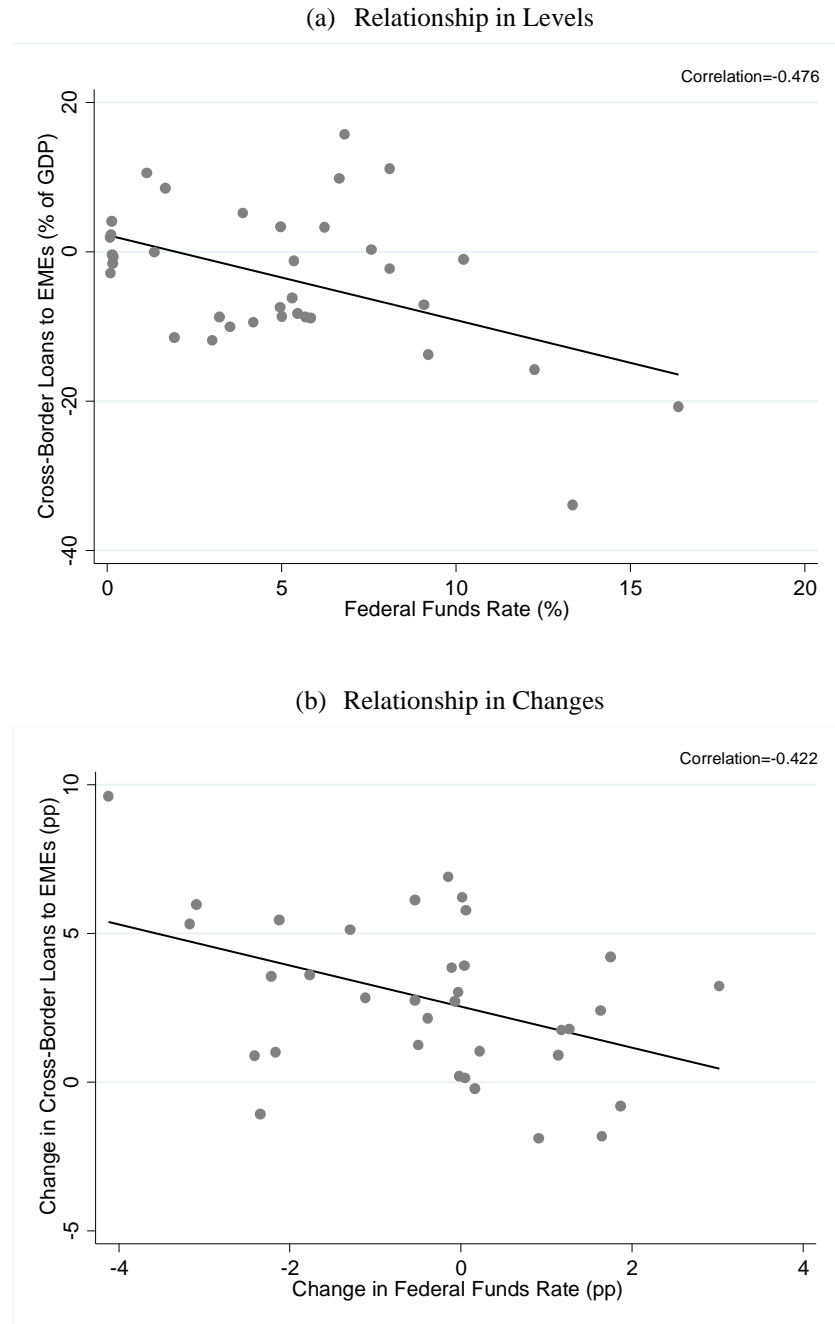
Note: This figure shows the relationship between cross-border loans to emerging market economies (EMEs) and U.S. monetary policy. Panel (a) plots the annual cross-border loans (as a percentage of GDP) against the annual U.S. federal funds rate. Panel (b) plots the annual change in cross-border loans (normalized with lagged GDP) against the annual change in the U.S. federal funds rate (in percentage points). Data on cross-border loans are compiled from the IMF International Investment Positions and cover the period from 1980 to 2015. Each observation in the plots corresponds to the median across 43 EMEs.
Source: Authors' calculations based on IMF data.

FIGURE II

CROSS-BORDER CLAIMS ON EMERGING AND DEVELOPED MARKET COUNTRIES

(a) Breakdown by Instrument

(b) Importance of Foreign Banks
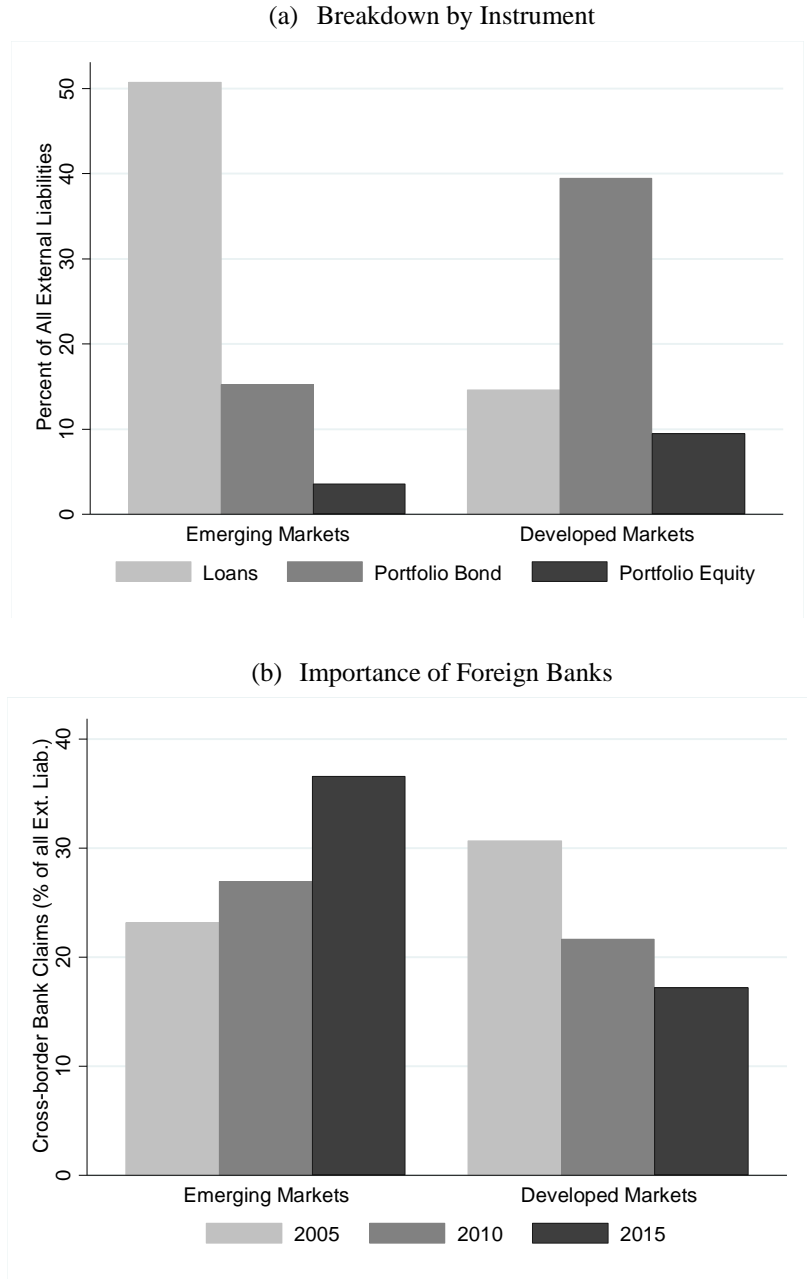
Note: This figure shows the composition of cross-border claims on countries in emerging markets (EMEs) and developed markets (DMEs). Panel (a) shows the amount of loans, portfolio bond, and portfolio equity investment held by foreigners relative to the total amount of all external liabilities in 2015. Panel (b) shows the share of external liabilities held by foreign banks. Both figures show the median values within each country group. Data on external liabilities are compiled from the IMF International Investment Position. Data on cross-border bank claims are compiled from the BIS Consolidated Banking Statistics, which has cross-border claims held by 24 banking sectors. The sample in both figures contains the same set of 29 DMEs and 43 EMEs.
Source: Authors' calculations based on IMF and BIS data.

FIGURE III

RELIANCE ON FOREIGN BANKS
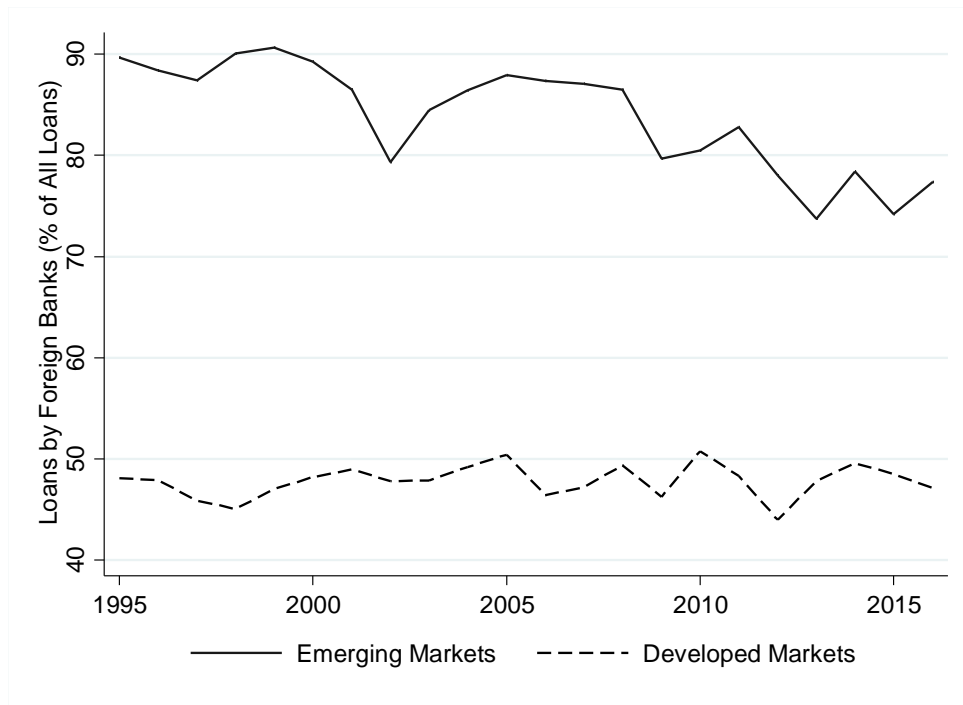
Note: This figure shows the quarterly share of loan commitments by foreign banks (relative to all loans) to borrowers in developed and emerging markets. The sample covers the period from 1995:Q1 through 2016:Q3 and includes the full DealScan dataset, with borrowers from 119 EMEs and 32 DMEs.
Source: Authors' calculations based on DealScan data.

FIGURE IV

CURRENCY BREAKDOWN OF CROSS-BORDER LOANS TO EMERGING MARKET ECONOMIES

(a) Emerging Africa
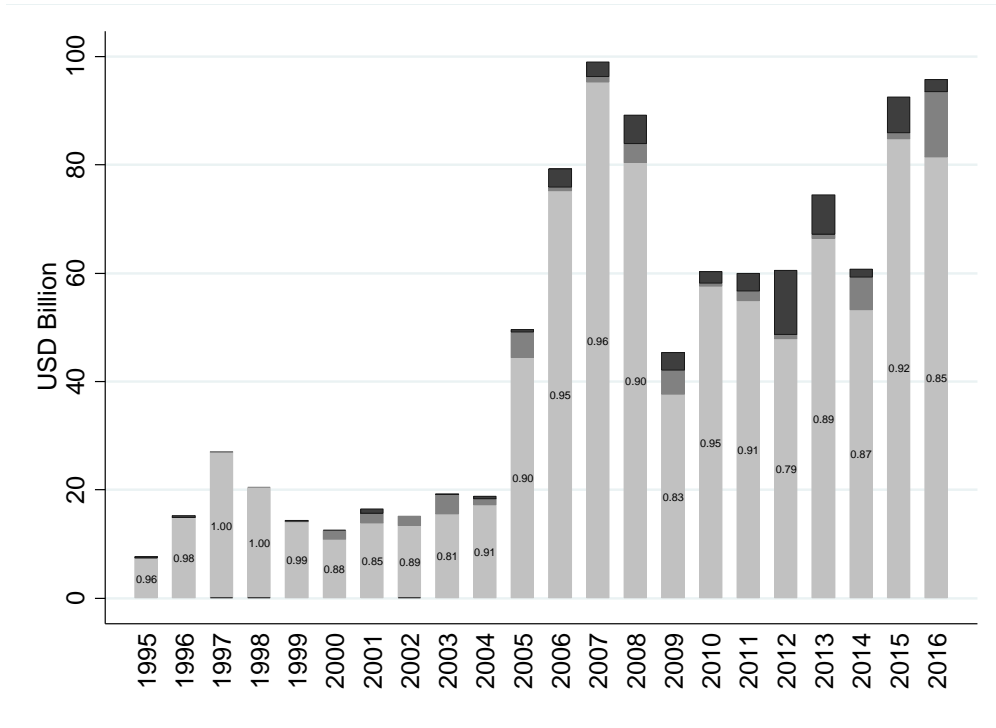
(b) Emerging America
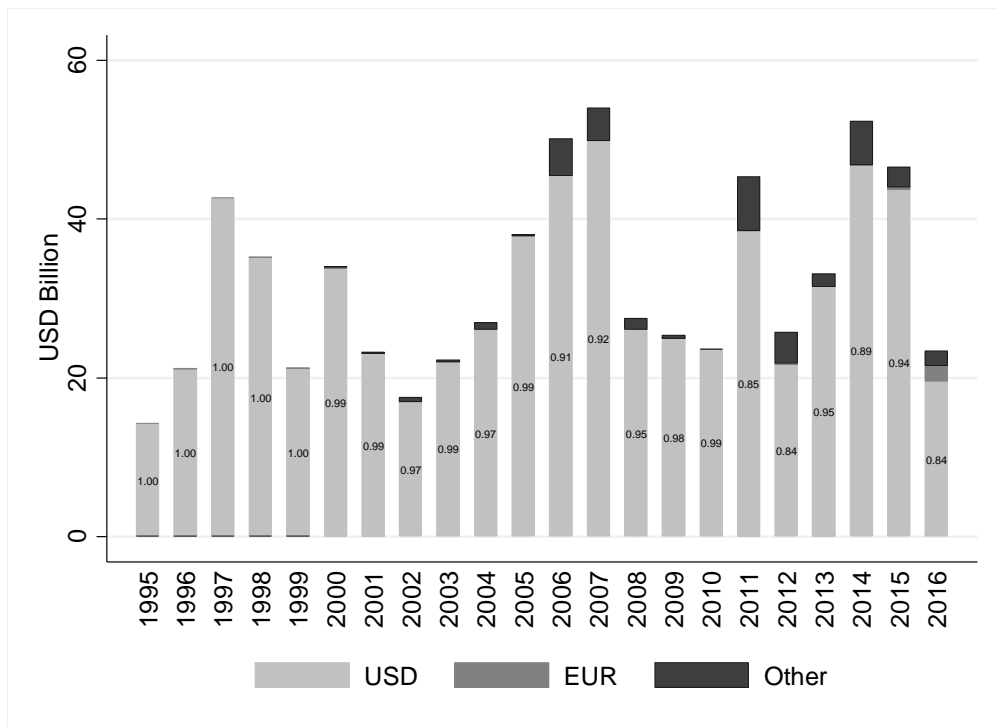
(c) Emerging Asia
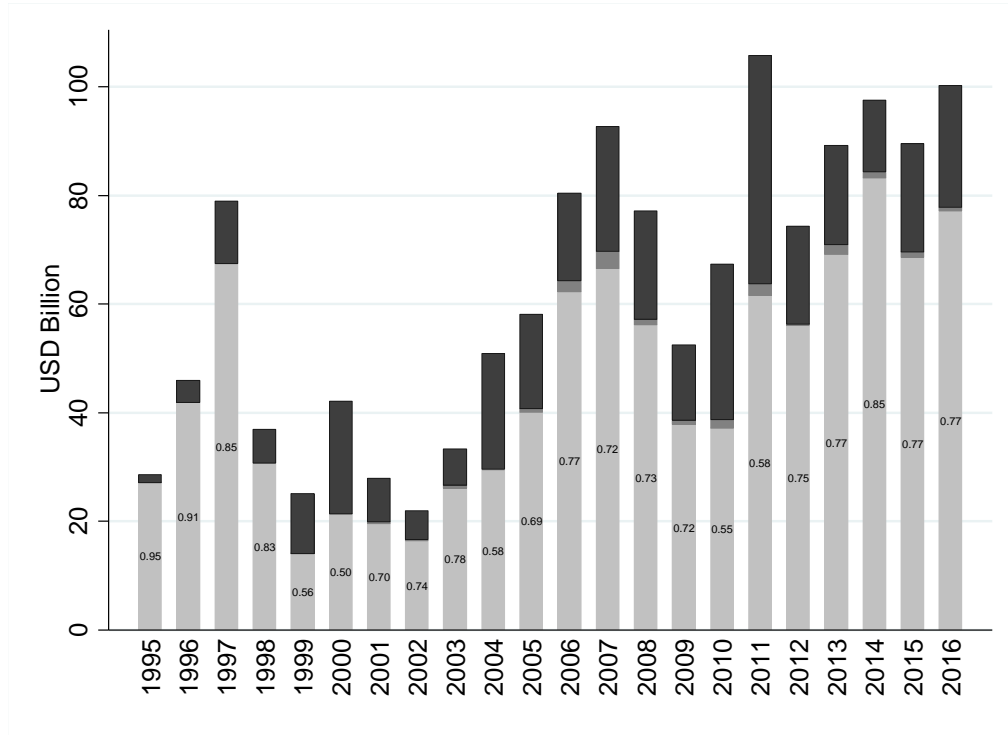
(d) Emerging Europe
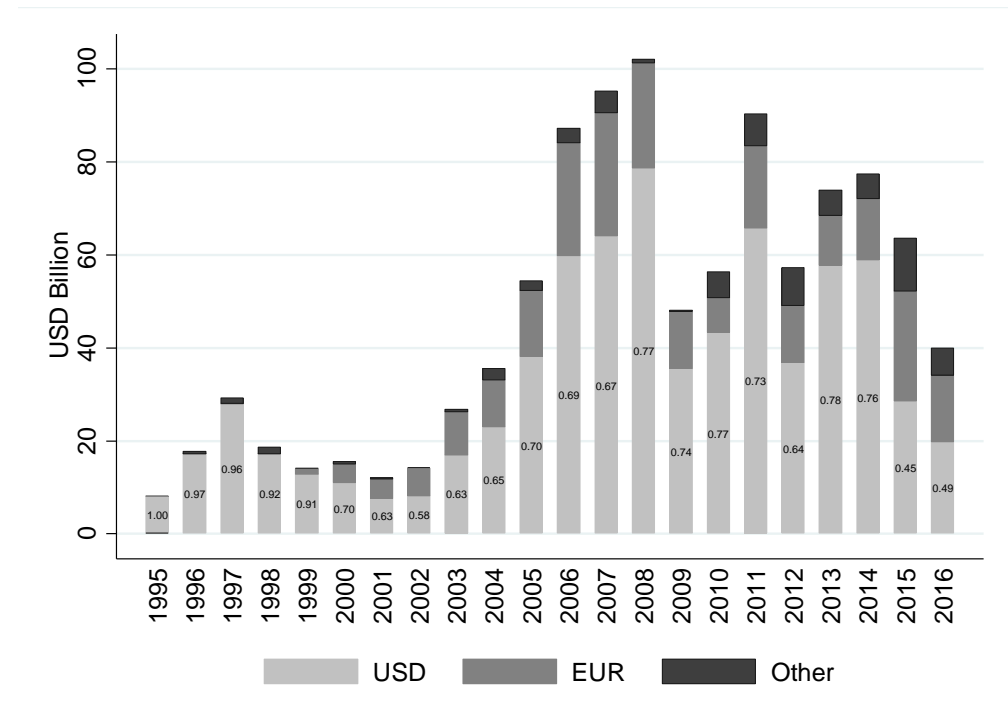
Note: The labels of the light grey (lower) bars correspond to the share of loans in each year that are denominated in
U.S. dollars. Country groups are based on the BIS classification. Offshore centers are excluded from the sample.
Source: Authors' calculations based on IMF and BIS data.

FIGURE V

LENDING TO EMES BY FOREIGN DME BANKS VS. LOCAL BANKS
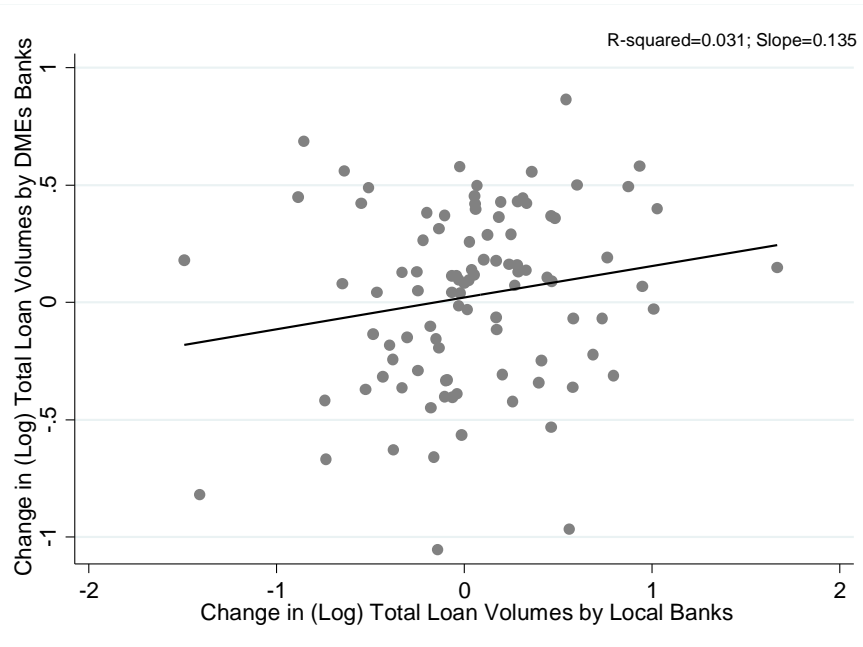
Note: The figure depicts the changes in the (logarithm of) syndicated loan volumes to EME borrowers by local lenders (horizontal axis) and DME/foreign lenders (vertical axis). Each data point corresponds to the change in lending by local and foreign banks in one quarter. The sample covers the period from 1990:Q1 to 2016:Q3.
Source: Authors' calculations based on DealScan data.

TABLE I – COUNTRY-LEVEL INFORMATION ON SYNDICATED CROSS-BORDER LOANS TO EMES

Country	# Firms	# Loans	Total Trade (% of GDP)	U.S. Trade (% of Total Trade)	Share of Loans in		
					USD	EUR	Other
Africa							
Algeria	7	15	47.6%	13.6%	93.3%	6.7%	0.0%
Angola	9	35	72.1%	29.5%	82.9%	8.6%	8.6%
Burundi	1	3	27.3%	3.2%	100.0%	0.0%	0.0%
Cameroon	8	13	29.9%	6.5%	69.2%	30.8%	0.0%
Congo	2	5	35.5%	3.4%	100.0%	0.0%	0.0%
Egypt	62	141	25.6%	11.3%	90.1%	4.3%	5.7%
Gabon	4	6	63.2%	32.9%	66.7%	16.7%	16.7%
Ghana	32	80	37.6%	8.0%	97.5%	1.3%	1.3%
Guinea	3	5	49.5%	11.9%	100.0%	0.0%	0.0%
Iran	17	51	26.6%	1.6%	74.5%	23.5%	2.0%
Iraq	3	6	61.3%	15.1%	50.0%	0.0%	50.0%
Israel	43	97	51.2%	22.6%	86.6%	9.3%	4.1%
Ivory Coast	16	23	60.2%	6.7%	91.3%	4.3%	4.3%
Jordan	19	23	78.8%	9.1%	87.0%	0.0%	13.0%
Kenya	20	28	34.8%	5.5%	82.1%	10.7%	7.1%
Kuwait	52	98	72.8%	10.1%	99.0%	0.0%	1.0%
Liberia	36	46	961.0%	5.5%	84.8%	2.2%	13.0%
Mali	5	15	37.7%	2.8%	33.3%	66.7%	0.0%
Morocco	13	16	45.1%	5.3%	81.3%	18.8%	0.0%
Mozambique	4	20	46.1%	4.9%	90.0%	5.0%	5.0%
Namibia	6	8	63.9%	2.8%	100.0%	0.0%	0.0%
Nigeria	51	84	28.9%	25.6%	96.4%	0.0%	3.6%
Oman	58	101	81.7%	4.4%	95.0%	1.0%	4.0%
Qatar	55	122	74.0%	4.2%	97.5%	1.6%	0.8%
Saudi Arabia	82	135	59.8%	16.4%	91.9%	4.4%	3.7%
Senegal	5	6	45.8%	3.0%	83.3%	16.7%	0.0%
Seychelles	1	5	92.8%	3.2%	80.0%	20.0%	0.0%
South Africa	127	321	25.2%	8.7%	73.5%	5.3%	21.2%
Tanzania	11	16	31.8%	3.1%	93.8%	0.0%	6.3%
Togo	1	2	54.5%	2.7%	50.0%	50.0%	0.0%
Tunisia	20	31	69.2%	4.0%	67.7%	29.0%	3.2%
United Arab Emirates	185	411	85.8%	5.5%	89.8%	3.9%	6.3%
Zambia	14	25	52.3%	3.8%	84.0%	4.0%	12.0%
Zimbabwe	11	16	57.4%	5.0%	100.0%	0.0%	0.0%
Total:	994	2,009			87.2%	5.5%	7.3%
Americas							
Argentina	196	372	19.4%	13.1%	95.7%	0.3%	4.0%
Bolivia	6	8	44.6%	18.1%	100.0%	0.0%	0.0%
Brazil	338	636	18.5%	19.3%	95.3%	0.5%	4.2%
Chile	207	417	48.9%	18.0%	96.6%	0.2%	3.1%
Colombia	91	158	23.2%	34.9%	96.8%	0.0%	3.2%
Costa Rica	12	15	64.2%	39.7%	100.0%	0.0%	0.0%
Dominican Republic	12	16	41.6%	49.0%	100.0%	0.0%	0.0%
Ecuador	9	10	39.6%	36.7%	100.0%	0.0%	0.0%
El Salvador	14	17	53.1%	40.9%	100.0%	0.0%	0.0%
Guatemala	13	16	44.4%	38.8%	100.0%	0.0%	0.0%
Honduras	4	12	54.9%	43.5%	100.0%	0.0%	0.0%
Jamaica	11	13	61.4%	42.0%	92.3%	0.0%	7.7%
Mexico	368	790	41.9%	68.8%	92.4%	0.3%	7.3%

Nicaragua	2	3	53.7%	23.9%	100.0%	0.0%	0.0%
Paraguay	3	4	49.6%	7.1%	100.0%	0.0%	0.0%
Peru	89	118	30.3%	25.1%	97.5%	0.0%	2.5%
Trinidad and Tobago	12	18	80.2%	44.5%	100.0%	0.0%	0.0%
Uruguay	14	16	31.1%	9.1%	100.0%	0.0%	0.0%
Venezuela	52	92	41.6%	41.4%	96.7%	0.0%	3.3%
Total:	1,505	2,731			95.2%	0.3%	4.6%
Asia							
Armenia	5	9	57.9%	8.9%	88.9%	11.1%	0.0%
Azerbaijan	21	59	63.3%	4.4%	93.2%	5.1%	1.7%
Bangladesh	21	30	24.5%	11.3%	86.7%	0.0%	13.3%
Cambodia	10	14	69.3%	12.2%	85.7%	0.0%	14.3%
China	1,051	1,704	61.8%	14.1%	75.4%	0.2%	24.5%
Georgia	7	10	52.5%	5.5%	100.0%	0.0%	0.0%
India	482	1,120	21.6%	11.6%	82.9%	2.0%	15.2%
Indonesia	655	1,224	37.9%	12.2%	92.6%	0.7%	6.8%
Kazakhstan	60	174	59.4%	2.9%	93.7%	4.6%	1.7%
Korea (South)	429	1,187	61.5%	19.1%	83.9%	2.8%	13.3%
Malaysia	339	523	132.7%	15.0%	63.5%	0.8%	35.8%
Mongolia	14	23	51.2%	5.2%	91.3%	0.0%	8.7%
Myanmar	4	9	44.1%	2.8%	100.0%	0.0%	0.0%
Pakistan	56	97	26.3%	11.4%	52.6%	0.0%	47.4%
Papua New Guinea	12	21	55.5%	4.0%	85.7%	0.0%	14.3%
Philippines	171	351	55.5%	21.8%	76.6%	0.3%	23.1%
Sri Lanka	21	49	47.9%	14.1%	91.8%	0.0%	8.2%
Tajikistan	7	10	100.7%	1.9%	100.0%	0.0%	0.0%
Thailand	411	801	83.5%	13.1%	78.5%	0.9%	20.6%
Turkmenistan	6	8	50.8%	4.1%	75.0%	0.0%	25.0%
Uzbekistan	13	21	40.6%	3.5%	76.2%	9.5%	14.3%
Vietnam	126	235	86.2%	6.1%	93.2%	0.9%	6.0%
Total:	4,047	7,679			81.3%	1.2%	17.5%
Europe							
Belarus	15	38	100.6%	1.5%	71.1%	26.3%	2.6%
Bulgaria	40	69	79.3%	2.5%	4.3%	92.8%	2.9%
Croatia	55	146	57.3%	2.4%	32.9%	63.0%	4.1%
Czech Republic	118	203	117.9%	2.3%	38.4%	23.2%	38.4%
Hungary	97	243	102.5%	2.8%	48.1%	45.7%	6.2%
Kosovo	5	10	20.7%	0.5%	0.0%	100.0%	0.0%
Poland	128	271	51.8%	2.4%	37.3%	35.8%	26.9%
Romania	94	169	54.4%	3.1%	43.8%	47.3%	8.9%
Russia	390	1,166	39.5%	5.2%	87.7%	7.5%	4.9%
Serbia	7	8	52.0%	1.7%	12.5%	87.5%	0.0%
Turkey	231	918	29.6%	7.1%	84.6%	13.6%	1.7%
Ukraine	79	202	74.0%	3.3%	92.1%	6.9%	1.0%
Total:	1,338	3,443			70.7%	21.6%	7.7%

Note: The table is based on syndicated cross-border loans issued from 1990:Q1 to 2016:Q3. Country groups are based on the BIS classification. Offshore centers are excluded from the sample. We also exclude countries with only non-repeat borrowers and four countries with missing trade data. Currency shares are based on loan counts. *Trade* is the average value of the sum of imports and exports of goods as a percentage of GDP. *U.S. Trade* is the average value of traded goods (imports plus exports) with the United States as a percentage of total traded goods. Data on trade and GDP are compiled from the IMF.

TABLE II – CURRENCY BREAKDOWN OF CROSS-BORDER BANK LOANS

Panel A: Cross-Border Loan Issuance by Industry and Region, 1990:Q1–2016:Q3

Region:	U.S. Dollar Shares			
	EME: Africa	EME: Americas	EME: Asia	EME: Europe
Tradable:				
Agriculture, Forestry and Fishing	75.6%	95.9%	80.6%	86.4%
Mining	91.2%	97.4%	92.9%	85.4%
Manufacturing	82.5%	95.6%	73.8%	63.3%
Non-Tradable:				
Construction	84.4%	79.6%	64.8%	31.5%
Transp., Communic., Electric, Gas, Sanitary	82.8%	95.9%	77.5%	49.6%
Wholesale Trade	88.0%	88.9%	72.6%	42.4%
Retail Trade	80.0%	90.5%	56.2%	34.7%
Finance, Insurance, Real Estate	91.5%	98.7%	79.1%	80.6%
Services	67.4%	92.9%	68.2%	33.6%
Public Administration	72.3%	85.0%	49.7%	69.0%

Panel B: Outstanding Cross-Border Loans as of 2016:Q3

Currency:	Cross-Border Loans (Source: DealScan)					Cross-Border "Bank Claims" (Source: BIS)				
	USD	EUR	GBP	JPY	Other	USD	EUR	GBP	JPY	Other
Region:										
EME: Africa	88.8%	5.3%	0.1%	0.8%	4.9%	65.5%	12.7%	3.9%	1.0%	16.9%
EME: Americas	91.3%	1.1%	0.0%	0.7%	6.9%	75.6%	4.4%	0.2%	1.7%	18.2%
EME: Asia	69.7%	1.3%	0.7%	4.2%	24.0%	51.9%	5.0%	0.3%	1.3%	41.5%
EME: Europe	56.0%	30.9%	0.0%	0.6%	12.5%	31.9%	38.8%	0.5%	1.1%	27.7%
DME	69.8%	19.7%	5.0%	0.7%	4.8%	43.3%	36.9%	4.9%	4.9%	10.1%

Note: Country groups are based on the BIS classification. Offshore centers are excluded from the sample. Industry classification is based on the 1-digit SIC code as reported in DealScan. Figures in Panel A are based on all loans issued between 1990:Q1 and 2016:Q3 and reported in DealScan. In Panel B, we report figures computed from our DealScan sample, and, for comparison, figures compiled from BIS data. DealScan tracks loan issuance; thus, statistics reported in the first five columns of Panel B are based on the estimated volume of outstanding claims as of 2016:Q3. Note that the BIS data include all outstanding cross-border claims held by banks (including equities and bonds).

Panel A: Full Samples

	(1)	(2)	(3)	(4)	(5)	Pre-ZLB Period (6)	ZLB Period (7)
U.S. Interest Rate	−0.144*** (−11.49)	--	--	--	--	--	--
U.S. Interest Rate * DME	--	−0.090*** (−9.98)	--	--	--	--	--
U.S. Interest Rate * EME	--	−0.194*** (−9.66)	−0.077*** (−7.54)	−0.081*** (−7.69)	−0.164*** (−12.71)	−0.074** (−3.41)	--
U.S. Term Spread * EME	--	--	--	--	−0.158*** (−6.80)	−0.092** (−3.08)	--
U.S. Shadow Rate * EME	--	--	--	--	--	--	−0.068** (−2.75)
EME	--	−0.951*** (13.43)	--	--	--	--	--
Fixed Effects:							
Quarter (D_t)	--	--	Yes	--	--	--	--
Bank (D_j)	--	--	Yes	--	--	--	--
Borrower (D_i)	--	--	Yes	Yes	Yes	Yes	Yes
Bank * Quarter (D_{jt})	--	--	--	Yes	Yes	Yes	Yes
Observations	171,276	170,518	161,596	158,188	158,188	111,918	38,909
R-squared	0.067	0.301	0.821	0.830	0.830	0.839	0.820

Panel B: Dollar Lending by Banks with Low Exposure to the U.S. Economy

Banks' Loan Exposure to U.S.:	< 10%	< 5%	< 5%	< 5%	< 5%	< 5%
Borrowers:			Non-Tradable Industry	Sectors with Low Export Share	Country with Low Trade Overall	Country with Low Trade with U.S.
	(1)	(2)	(3)	(4)	(5)	(6)
U.S. Interest Rate * EME	−0.159*** (−5.58)	−0.078* (−1.79)	−0.091** (−1.99)	−0.181*** (−2.69)	−0.092** (−2.09)	−0.348*** (−5.71)
U.S. Term Spread * EME	−0.186*** (−4.29)	−0.112* (−1.76)	−0.135** (−2.02)	−0.073 (−0.26)	−0.092 (−1.51)	−0.517*** (−5.97)
Fixed Effects:						
Borrower (D_i)	Yes	Yes	Yes	Yes	Yes	Yes
Bank * Quarter (D_{jt})	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,749	11,147	9,158	2,639	4,841	3,807
R-squared	0.874	0.897	0.905	0.930	0.902	0.931

Note: The dependent variable is the logarithm of the dollar loan amount originated by a given bank to a given firm in a given quarter. *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points), that is, the slope of the yield curve. *Shadow Rate* is a single measure of monetary policy during the zero-lower bound period constructed by Wu and Xia (2016). *EME* is a dummy variable that equals one if the firm is located in an emerging market country (as defined by BIS), and zero otherwise. *DME* is a dummy that equals one if the borrower is located in a developed market country, and zero otherwise. The sample in columns (1)–(5), both panels, covers the period from 1990:Q1 through 2016:Q3. The sample in Panel A, column (6) covers the period from 1990:Q1 through 2008:Q3. Panel A, column (7), shows that our main result holds during the period when the federal funds rate was at the zero lower bound (2008:Q4–2015:Q3). Panel B replicates the results in Panel A, column (5), while focusing on non-U.S. lenders and non-U.S. borrowers that are unlikely to be connected to the U.S. economy. Non-U.S. Banks with low U.S. exposure are

identified based on the number of loans to U.S. borrowers in the entire sample (relative to all loans). Column (3) contains only EME borrowers from the non-tradable sectors based on the SIC 1-digit classification as reported in DealScan. Column (4) contains only EME borrowers from sectors that produce goods and services with an export share below the 25th percentile (based on the distribution of export shares of all goods and services for each borrower country). Column (5) contains only loans to EME borrowers from countries with an average total trade-to-GDP share below the 25th percentile of the cross-country distribution (see Table I). Column (6) contains only loans to EME borrowers from countries with the average U.S. trade share (relative to total trade) below the 25th percentile of the cross-country distribution (see Table I). Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	"High–Yield Market" Defined Using:							
	GDP Growth	GDP Growth	Interest Rate Spread	Interest Rate Spread	Equity Returns	Equity Returns	Country Rating	Country Rating
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
U.S. Interest Rate * High-Yield Market	–0.002**	–0.006***	–0.003***	–0.004***	–0.024*	–0.031	–0.007***	–0.014***
	(–2.05)	(–3.00)	(–5.65)	(–3.65)	(–1.68)	(–0.80)	(–6.45)	(–7.92)
U.S. Term Spread * High-Yield Market	--	–0.007*	--	–0.001	--	–0.013	--	–0.012***
		(–1.97)		(–0.92)		(–0.20)		(–4.49)
High-Yield Market	0.014***	0.036***	0.014***	0.019***	0.025	0.065	–0.063***	–0.010
	(2.71)	(3.08)	(5.36)	(2.91)	(0.35)	(0.31)	(–5.23)	(–0.69)
Fixed Effects:								
Borrower (D_i)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank * Quarter (D_{jt})	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	151,702	151,702	136,691	136,691	136,531	136,531	132,246	132,246
R-squared	0.825	0.825	0.822	0.822	0.804	0.804	0.811	0.812

Note: The dependent variable is the logarithm of the dollar loan amount originated by a given bank to a given firm in a given quarter. *GDP Growth*, , *Interest Rate Spread, Equity Returns*, and *Country Rating* describe the home country of the borrower and correspond to lagged values of GDP growth, the spread between the local EME interest rate and the U.S. federal funds rate, stock-market index growth, and the sovereign debt rating ("AAA"=1, "AA+"=2, etc.). Growth rates are in percentage terms. As before, *U.S. Interest Rate* is the federal funds rate (in percent), and *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Loan Currency:	USD	USD	USD	USD	EUR
			Non-U.S. Banks, Non-U.S. Borrowers		U.S. Banks, Non-EU Borrowers
	(1)	(2)	(3)	(4)	(5)
Euro Interest Rate * EME	–0.147***	–0.018	–0.034	--	–0.228**
	(–7.82)	(–0.57)	(–0.86)		(–2.37)
Euro Term Spread * EME	–0.036	0.030	0.046	--	–0.136
	(–1.25)	(1.10)	(1.17)		(–0.71)
U.S. Interest Rate * EME	--	–0.191***	–0.187***	–0.196***	–0.029
		(–5.64)	(–4.00)	(–4.05)	(–0.21)
U.S. Term Spread * EME	--	–0.223***	–0.263***	–0.343***	–0.136
		(–5.34)	(–4.42)	(–4.21)	(–0.71)
Fixed Effects:					
Borrower (D_i)	Yes	Yes	Yes	Yes	Yes
Bank * Quarter (D_{jt})	Yes	Yes	Yes	Yes	Yes
Observations	113,277	113,277	51,091	16,809	210
R-squared	0.825	0.826	0.843	0.887	0.940

Note: This table highlights the special role of U.S. monetary police for global dollar credit. The dependent variable is the logarithm of the loan amount originated by a given bank to a given firm in a given quarter. *Euro Interest Rate* is the overnight rate EONIA (in percent). *Euro Term Spread* is the difference between the 10-year generic euro-area bond yield and the euro overnight rate (in percentage points). *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). Columns (3) and (4) exclude U.S. banks and U.S. borrowers from the sample. Column (4) includes only quarters where U.S. monetary policy was easing and ECB monetary policy was tightening (or vice versa). Column (5) looks at euro-denominated loans by U.S. firms to non-EU borrowers. The sample covers the period from 1999:Q1 (introduction of the euro) until 2016:Q3. Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE VI – BIS CROSS-BORDER CLAIMS BY BANKS FROM DEVELOPED COUNTRIES

Dependent Variable:	(Log) Claims on Firms (Nonbank Private Sector)					(Log) Claims on Banks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
U.S. Interest Rate	−0.095*** (−5.63)	--	--	--	--	--	--
U.S. Interest Rate * DME	--	−0.011 (−0.60)	--	--	--	--	--
U.S. Interest Rate * EME	--	−0.129*** (−7.20)	−0.107*** (−10.27)	−0.103*** (−10.28)	−0.211*** (−12.60)	−0.171*** (−11.55)	−0.371*** (−16.28)
U.S. Term Spread * EME	--	--	--	--	−0.193*** (−6.19)	--	−0.356*** (−8.59)
EME	--	−1.784*** (−43.93)	--	--	--	--	--
Fixed Effects:							
Quarter (D_t)	--	--	Yes	--	--	--	--
Bank Country (D_J)	--	--	Yes	--	--	--	--
Borrower Country (D_l)	--	--	Yes	Yes	Yes	Yes	Yes
Bank Country * Quarter (D_{Jt})	--	--	--	Yes	Yes	Yes	Yes
Observations	43,206	43,206	43,204	43,204	43,204	40,416	40,416
R-squared	0.004	0.113	0.931	0.945	0.945	0.908	0.910

Note: The purpose of this table is to confirm the robustness of the main result in Table III, using data on all forms of bank claims on firms (and not just syndicated credit). This sample also covers a larger set of countries. These data are collected from the BIS Consolidated Banking Statistics. The dependent variable is the logarithm of the claim amount held by a developed market banking sector on a given country in a given quarter. *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). *EME* is a dummy variable that equals one if the firm is located in an emerging market country (as defined by BIS), and zero otherwise. *DME* is a dummy that equals one if the borrower is located in a developed market country, and zero otherwise. The sample covers the period from 2005:Q1 through 2016:Q3, which is the period for which the data are publically available. Robust *t*-statistics are in parentheses. The estimate of the constant is not shown. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE VII – U.S. MONETARY POLICY AND EME FINANCIAL OPENNESS

Dependent Variable:	(Log) Claims on Firms (Nonbank Private Sector)				
	(1)	(2)	(3)	(4)	(5)
U.S. Interest Rate	–0.117***	–0.080***	--	--	--
	(–6.32)	(–4.11)			
Financial Openness Index	0.286***	0.375***	0.416***	0.463***	0.215
	(2.81)	(3.50)	(4.28)	(4.16)	(1.43)
U.S. Interest Rate * Financial Openness Index	--	–0.071***	–0.070***	–0.081***	–0.066**
		(–9.21)	(–8.17)	(–5.27)	(–2.47)
U.S. Term Spread * Financial Openness Index	--	--	--	–0.018	–0.034
				(–0.68)	(–0.87)
Country Rating (1=AAA, 2= AA+, etc.)	--	--	--	--	–0.082***
					(–3.44)
Fixed Effects:					
Bank Country (D_J)	Yes	Yes	--	--	--
Borrower Country (D_I)	Yes	Yes	Yes	Yes	Yes
Bank Country * Quarter (D_{Jt})	--	--	Yes	Yes	Yes
Observations	22,049	22,049	22,008	22,008	14,750
R-squared	0.500	0.500	0.525	0.525	0.516

Note: The dependent variable is the logarithm of the claim amount held by a developed market banking sector on a given emerging market country in a given quarter. *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). *Financial Openness Index* measures the capital account openness of the host country. The index ranges from zero to one, with zero indicating the lowest financial openness and one indicating the highest financial openness. *Country Rating* is the lagged sovereign debt rating of the host country. The sample covers quarterly claims on emerging market countries from 2005:Q1 through 2014:Q4. Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE VIII – TOTAL DOLLAR BORROWING AT THE FIRM LEVEL

Dependent Variable:	(Log) Borrowing Amount (USD)						Interest Rate Spread (bps)	
	Firm-Quarters with Foreign and Domestic Lenders							
	Foreign Banks	Foreign Banks	Local Banks	All Banks	All Banks	All Banks	All Banks	All Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
U.S. Interest Rate	−0.032***	--	--	--	--	--	--	--
	(−2.80)							
U.S. Interest Rate * EME	−0.055***	−0.075***	−0.085***	−0.079***	−0.024***	−0.036***	3.855***	9.402***
	(−3.09)	(−4.51)	(−6.61)	(−5.54)	(−2.65)	(−3.10)	(2.72)	(4.61)
U.S. Term Spread * EME	--	--	--	--	--	−0.023	--	10.007***
						(−1.20)		(2.82)
Fixed Effects:								
Borrower (D_i)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter (D_t)	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,754	24,754	24,754	24,754	40,134	40,134	30,829	30,829
R-squared	0.718	0.750	0.793	0.781	0.783	0.783	0.803	0.803

Note: In columns (1) to (7), the dependent variable is the logarithm of the volume of total dollar borrowing (in USD billion) at the firm-quarter level. In columns (8) to (10), the dependent variable is the average all-in-drawn spread to the 3M LIBOR rate (in bps) of all dollar loans the borrower received in a given month. *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). *EME* is a dummy variable that equals one if the firm is located in an emerging market country (as defined by BIS), and zero otherwise. The sample period covers 1990:Q1 through 2016:Q3. Columns (1) through (4) contain firm-quarters with lending by both foreign and local banks; the remaining columns are based on all firm-quarters with lending by foreign banks. Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable:	(Log) Borrowing Amount (USD)				Interest Rate Spread (bps)		Probability of Refinancing	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
U.S. Interest Rate	–0.175***	–0.206***	--	--	--	--	--	--
	(–8.97)	(–7.04)						
Past Foreign Bank Reliance	0.546***	0.442***	0.155**	0.200	–6.111	–75.645***	0.044	0.232***
	(9.82)	(6.11)	(2.10)	(1.11)	(–0.62)	(–3.57)	(1.02)	(2.74)
Past Foreign Bank Reliance * U.S. Interest	--	0.041*	–0.035*	–0.042	2.867	14.430***	–0.023**	–0.057***
		(1.84)	(–1.67)	(–1.19)	(1.18)	(3.78)	(–2.37)	(–3.29)
Past Foreign Bank Reliance * U.S. Term	--	--	--	–0.017	--	25.392***	--	–0.067**
				(–0.27)		(3.42)		(–2.52)
Fixed Effects:								
Borrower (D_i)	--	--	Yes	Yes	Yes	Yes	Yes	Yes
Quarter (D_t)	--	--	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,246	6,246	5,227	5,227	3,469	3,469	6,943	6,943
R-squared	0.120	0.120	0.732	0.732	0.789	0.790	0.354	0.355

Note: In columns (1) to (4), the dependent variable is the logarithm of the volume of total dollar borrowing (in USD billion) at the firm-quarter level. In columns (5) and (6), the dependent variable is the average all-in-drawn spread to the 3M LIBOR rate (in basis points) of all dollar loans the EME borrower received in a given month. In columns (7) and (8), the dependent variable is a dummy variable equal to one if an EME firm obtains a new loan in the quarter when an earlier loan matures and zero otherwise. *Past Foreign Bank Reliance* is the share of global banks from developed countries lending to the firm in the last quarter the firm was borrowing. As before, *U.S. Interest Rate* is the federal funds rate (in percent). *U.S. Term Spread* is the difference between the 10-year U.S. Treasury yield and the federal funds rate (in percentage points). The sample period covers 1990:Q1 through 2016:Q3 and contains only EME firms. Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE A.I – GLOBAL BANKS' EME LENDING BY REGION AND INDUSTRY

	U.S. Interest Rate * EME	t-stat.	Obs.	R-squared
	Panel A: Split by Region			
EME: Africa	–0.083***	(–5.24)	108,837	0.761
EME: Americas	–0.050***	(–3.48)	110,576	0.756
EME: Asia	–0.090***	(–7.49)	122,865	0.823
EME: Europe	–0.081***	(–4.78)	115,527	0.796
	Panel B: Split by Industry			
Tradable				
Agriculture, Forestry and Fishing	–0.135***	(–3.61)	5,797	0.944
Mining	–0.047**	(–2.18)	15,117	0.755
Manufacturing	–0.113***	(–7.07)	35,651	0.824
Non-Tradable				
Construction	–0.058	(–0.91)	734	0.943
Transp., Communic., Electric, Gas, Sanitary	–0.051***	(–2.78)	28,970	0.774
Wholesale Trade	–0.085**	(–2.06)	3,154	0.862
Retail Trade	–0.038	(–0.45)	2,462	0.833
Finance, Insurance, Real Estate	–0.053***	(–3.14)	38,621	0.874
Services	0.038	(0.86)	10,747	0.780
Public Administration	0.241*	(1.73)	951	0.874

Note: In this table we replicate the baseline result in Table III, column (4) for borrowers from different regions and industries; that is, each coefficient reported in this table corresponds to the same regression estimated based on different subsamples. The common regression equation is given by $\text{Log}(Loan\ Amount_{jit}) = \beta \cdot U.S.\ Interest\ Rate_t \cdot EME_i + D_{jt} + D_i + \epsilon_{jit}$, where the dependent variable is the logarithm of the loan amount originated by bank j to firm i in quarter t. D_{jt} is a bank*quarter fixed effect, and D_i is a borrower fixed effect. *U.S. Interest Rate* is the federal funds rate. *EME* is a dummy variable that equals one if the firm is located in the corresponding emerging market region (as defined by BIS), and zero otherwise. Offshore centers are excluded from the sample. Industry classification is based on the 1-digit SIC code as reported in DealScan. The sample covers the period from 1990:Q1 through 2016:Q3. Robust t-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE A.II – U.S. MONETARY POLICY AND INFRASTRUCTURE-RELATED CREDIT IN EMERGING MARKETS

	Project Finance Loans				Corporate Loans					
	All Projects		Infrastructure-Related		Infrastructure Sector (WB)		Infrastructure Sector (BIS)		Maturity > 5Y	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
U.S. Interest Rate	–0.050**	--	–0.068**	--	–0.003	--	–0.005	--	–0.022**	--
	(–2.60)		(–2.60)		(–0.24)		(–0.50)		(–2.20)	
U.S. Interest Rate * EME	–0.084***	–0.087***	–0.063*	–0.055*	–0.044	–0.059**	–0.066***	–0.079***	–0.057***	–0.070***
	(–3.28)	(–3.77)	(–1.95)	(–1.92)	(–1.56)	(–2.08)	(–4.03)	(–4.87)	(–3.37)	(–4.63)
EME	–0.010	0.021	–0.151	–0.063	--	--	--	--	--	--
	(–0.11)	(0.24)	(–1.24)	(–0.55)						
Fixed Effects:										
Quarter (D_t)	--	Yes	--	Yes	--	Yes	--	Yes	--	Yes
Bank (D_j)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower (D_i)	--	--	--	--	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,494	10,493	6,458	6,458	20,340	20,340	68,220	68,220	72,850	72,850
R-squared	0.177	0.292	0.206	0.359	0.705	0.730	0.693	0.716	0.768	0.787

Note: The dependent variable is the logarithm of the dollar loan amount originated by a given bank to a given firm in a given quarter. *U.S. Interest Rate* is the federal funds rate (in percent). *EME* is a dummy variable that equals one if the firm is located in an emerging market country (as defined by BIS), and zero otherwise. The sample covers loans by developed countries banks during the period from 1990:Q1 through 2016:Q3. We use different methods to identify infrastructure-related projects, including the maturity of the loan and sector of the borrower. In columns (3) and (4), we restrict the sample to infrastructure-related projects as classified in World Bank (2016). In columns (5)–(7) we look at corporate loans to borrowers from infrastructure-relevant sectors, based on the classifications by the World Bank (2016) and the BIS (Ehlers 2014). Columns (9) and (10) focus on corporate loans with maturity longer than 5 years, given that infrastructure-related credit is typically of long maturity. Given that the structure of the investment where the assets of the sponsor are ring-fenced and repeated projects by the same sponsor are rare, we do not include borrower fixed effects in Columns (1)–(4). Robust *t*-statistics are in parentheses. Standard errors are clustered at the quarter level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.